

approximate gradient 0.036, or 36 ft per 1,000 ft. However, the groundwater elevation data upon which this calculation is based span a 12-year period.

Regional groundwater flow data from the WZI (1988) map in Attachment 15 was used to determine a general groundwater flow direction and gradient in the unconfined upper Tulare aquifer. In the northwestern area of Section 18G, groundwater was estimated to flow southeasterly at a gradient of about 13 ft per 1,000 ft, or 0.013.

No maps of or head data from the confined upper or lower Tulare aquifers could be located. However, groundwater flow probably approximates the structural trend shown on the base of Tulare clay structural contour map in Attachment 6, which is toward the southeast.

E. Direction and rate of injected fluid migration:

*What about providing regional flow basis? what's assumption in wells in any other inj. wells in same zone nearby? Near enough to affect GW flow, etc.*

Site-specific data on regional groundwater flow is limited. The minimum rate of injectate migration was determined by assuming the injectate would migrate radially from the injection well. Based on waste front calculations over a 20-year period (Attachment 18):

Average rate of injectate migration (dispersion) = (Distance of waste-front) / (time)

No. of Years	Distance (ft)	Average Rate (ft/yr)
1	252	252
5	521	104
10	719	72
20	994	50

The direction of fluid migration was assumed to follow the regional groundwater flow for the upper Tulare aquifer, as discussed in Section 6D.

F. TDS (salinity) profiles:

Groundwater TDS levels in the unconfined alluvial, upper Tulare, and lower Tulare aquifers are shown on cross-section B-B' in Attachment 8. The average 1993 TDS concentrations were plotted on cross-section B-B' to show the variation in TDS between wells completed in the Tulare injection interval.

A representative sample from commingled water source well formation water collected from the 33S water plant also is included in Attachment 19 as an average TDS concentration for a wider area of the injection zone.

G. Specific gravity or density:

0.435 psi/ft

The density of a representative sample of formation water was 1.004 g/cm<sup>3</sup> (Attachment 13). The formation water sample was collected from the 33S water plant and consist of commingled water from source wells in the 13B, 14B, and 18G areas.

H. Temperature and pH:

Temperature within the injection zone is estimated to range from 76°F to 101°F based on an initial surface temperature of 65°F and a geothermal gradient of 2°F/100 ft.

pH = 7.0 at the time of collection for the sample shown in Attachment 13.

7. INJECTION FLUID CHARACTERISTICS

A. Narrative description of individual waste streams:

The wastewater to be injected into the proposed disposal wells will be obtained primarily from the cooling tower waste blowdown. The West Kern Water District (WKWD) will supply source water to the project via a new 9.8-mile, 16-inch pipeline extending from existing WKWD facilities. The water will be recycled approximately six times, resulting in a disposal stream that is chemically concentrated about 600 percent above the original source water. Additional process wastewater streams consist of plant area washwater, demineralizer resins regeneration wastewater, plant and equipment drains, filter backwash, and non-oil contaminated storm runoff.

B. Mix ratio (average, maximum, daily):

Estimated mix ratios of the various waste streams are summarized in the table below. Peak loads are assumed to occur during the winter, rainy season.